

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) A diffraction grating comprising a plurality of grooves formed in [[a]] an optical substrate with each groove having:

a) a reflective facet having at least one coated region coated with electrically conducting material and at least one uncoated region not coated with electrically conducting material;

b) at least one sidewall to the reflective facet, the sidewall not coated with electrically conductive material.

2. (Currently amended) [[A]] The diffraction grating according to claim 1 wherein:

in each reflective facet, said at least one coated region comprises a single coated region, and said at least one uncoated region comprises two uncoated regions on either side of the single coated region.

3. - 4. (Cancelled)

5. (Currently amended) [[A]] The diffraction grating according to claim 1 wherein the optical substrate comprises ~~an optical planar waveguide which consists of~~ at least one layer of high refractive index surrounded on both sides by media of lower refractive index, the plane of said optical substrate perpendicular to the reflective facet.

6. - 10 (Cancelled)

11. (Currently amended) [[A]] The diffraction grating

according to claim 1, wherein ~~comprising a~~ the plurality of reflective facets are embedded within [[an]] the optical ~~medium~~ substrate.

12. (Currently amended) [[A]] The diffraction grating according to claim ~~11~~ 1, wherein the reflective facets form a stepped arrangement.

13. (Cancelled)

14. (Currently amended) [[A]] The diffraction grating according to claim 11 wherein ~~the optical medium comprises a plurality of grooves in a substrate with each groove having a surface which serves as a reflective facet and also having a sidewall, with material with refractive index similar to that of the substrate deposited in spaces adjoining the facets and sidewalls~~ groove-filling material with a refractive index similar to that of the optical substrate is deposited in spaces in each groove adjoining said reflective facet and said at least one sidewall .

15. (Currently amended) A diffraction grating comprising a plurality of reflective facets embedded within an optical substrate wherein the optical substrate comprises a plurality of grooves with each groove having a surface which serves as a reflective facet and also having a sidewall, with groove-filling material with refractive index similar to that of the optical substrate deposited in spaces adjoining the facets and sidewalls, ~~A diffraction grating according claim 14 wherein the optical substrate comprises an optical waveguide which consists of at least one layer of high refractive index surrounded by media of lower refractive index, the plane of said optical substrate perpendicular to the reflective facets.~~

16. (Currently amended) [[A]] The diffraction grating

according to claim ~~44~~ 15 wherein the groove-filling material has a layer structure and indices similar to the respective layers of the optical waveguide substrate.

17. (Currently amended) [[A]] The diffraction grating according to claim 14 wherein the groove-filling material is a single material matched in index to the effective index of the optical waveguide substrate.

18. (Currently amended) [[A]] The diffraction grating according to claim 1, wherein comprising a plurality of grooves in a substrate with each groove having a surface which serves as a reflective facet, and having effectively no sidewalls between the facets, said sidewalls being rendered effectively invisible by the application of material with a refractive index similar to that of the substrate, the application being in the spaces adjoining both the facets and the sidewalls groove-filling material with a refractive index similar to that of the optical substrate is applied in spaces in each groove adjoining said facet and said at least one sidewall rendering said sidewall effectively invisible .

19. - 20 (Cancelled)

21. (Currently amended) [[A]] The diffraction grating according to claim 18 wherein the reflective facets reflect the totality of light incident to the grating.

22. (Currently amended) [[A]] The diffraction grating according to claim 18 wherein the reflective facets reflect a substantial fraction of incident light, with light allowed to escape around the edges of the reflecting portions.

23. (Currently amended) A diffraction grating comprising a plurality of grooves in an optical substrate with each groove having a surface which serves as a reflective facet, and having

effectively no sidewalls between the facets, said sidewalls being rendered effectively invisible by the application of material with a refractive index similar to that of the substrate, the application being in the spaces adjoining both the facets and the sidewalls ~~A diffraction grating according to claim 18~~ wherein the reflective facets reflect a substantial fraction of incident light, with light allowed to escape through small gaps within the otherwise reflecting portions.

24. (Currently amended) [[A]] The diffraction grating according to claim 18 wherein the optical substrate comprises at least one layer of high refractive index surrounded by media of lower refractive index and the groove-filling material has a layer structure and indices similar to the respective layers of the optical ~~waveguide~~ substrate.

25. (Currently amended) [[A]] The diffraction grating according to claim 18 wherein the groove-filling material is a single material matched in index to the effective index of the optical ~~waveguide~~ substrate.

26. (Currently amended) [[A]] The diffraction grating according to claim 18 wherein the groove-filling material is an optical material that is transparent to light of a pre-determined wavelength.

27. (Currently amended) A diffraction grating comprising a plurality of grooves in an optical substrate with each groove having a surface which serves as a reflective facet, and having effectively no sidewalls between the facets, said sidewalls being rendered effectively invisible by the application of material with a refractive index similar to that of the substrate, the application being in the spaces adjoining both the facets and the sidewalls ~~A diffraction grating according to claim 18~~ wherein the optical substrate comprises ~~an optical waveguide which consists~~

of at least one layer of high refractive index surrounded by media of lower refractive index, the plane of said optical substrate being perpendicular to the reflective facet.

28. - 35 (Cancelled)

36. (Currently amended) [[A]] The diffraction grating according to claim 1 wherein in each reflective facet, said at least one uncoated region comprises surfaces intermediate between the coated region of the reflective facet and the sidewalls, connecting the reflective facet to the sidewalls.

37. (Currently amended) [[A]] The diffraction grating according to claim 1 wherein each sidewall is transverse the reflective facet.

38. (Cancelled)